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The Pennsylvania State College Correspondence Courses in Nature Study

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Insect Life

LESSON NO. 7

THE COLORADO POTATO BEETLE

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THERE is probably no insect that we could choose that would be a better subject for the study of insect life in all its manifestations: for, in this case, we have the four stages—egg, larva, pupa and imago—sharply defined. The potato beetle is a true beetle, and not a bug. The distinction to be made between the two is, that the beetle is a hard-shelled insect with chewing mouth-parts, while the true bug is an insect with sucking mouth-parts. Therefore, we should always say potato *beetle* and not potato *bug*. It is called the Colorado potato beetle, because it originally lived at the base of the Rocky mountains in Colorado, feeding upon a native species of solanum, the genus of plants to which the cultivated potato belongs. Having a pair of hard-shelled wings is an evidence of its being a member of the large order of insects known as the Coleoptera, which we may regard as including all the beetles. Professor Comstock tells us there are more than eleven thousand species of beetles known to occur in America north of Mexico. About 80,000 species are known to entomologists. It is interesting to observe the history of the spread of this insect from its original home in Colorado to the neighboring states, and by stages to the extreme eastern states. It was first brought to notice about the year 1856. In 1859, it was found in the potato fields of the settlers of Kansas. In 1861, it was

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in Iowa, and in 1862, it appeared in southwestern Wisconsin. It crossed the Mississippi river into Illinois in 1864. It was in Michigan and Indiana in 1867, Ohio in 1868, and Pennsylvania in 1870. It moved eastward at the rate of about fifty miles a year for a number of years, but later it traveled more rapidly. It is reported to have reached the Atlantic coast about 1874, and Nova Scotia about 1882. When it reached the Atlantic coast, it had traveled 1,500 miles in 16 years, and nearly a thousand miles more the next eight years in its march to Nova Scotia.

In this way many noxious insects gain a foothold at some point and spread over a great area, become a permanent pest, and damage crops to the extent of millions of dollars. The Colorado potato beetle has, on several occasions, been observed in European countries, but the alarm aroused at the time of its rapid spreading in the United States extended to European countries, and governmental control seems thus far to have been successful in preventing its being firmly established in foreign countries.

The destruction of potato fields excited in the minds of many fears that it would entirely destroy the business of potato growing. Laws were enacted in England about the year 1877 to the effect that any person importing a living Colorado beetle should be liable to a fine not exceeding ten pounds (fifty dollars), and that if any person found specimens upon vegetation, he should give prompt notice of the same to the constable of the police establishment of the locality.

Let us now study the beetle. We find the three pairs of legs, two pairs of wings, one pair of antennæ, one pair of compound eyes, and a body divisible into the head, thorax and abdomen, thus far a typical insect. The most noticeable difference between this and any previous insect we have studied is in the modification of the first pair of wings. This pair covers the major portion of the body. The two pieces fit closely together, their union forming a straight line down the back. They are hard, and known as the *elytra*, or shield wings. We find on each one of this pair five dark lines upon an orange-yellow ground, making in all ten such black lines along the body. The insect is clumsy in flight, because it is with difficulty that this first pair of wings is raised from the body to allow the second pair to be extended to carry the body. The wings of the second pair are membranous and about twice as long as the first pair. Therefore, to be concealed under the elytra, they must be folded or doubled-in lengthwise and crosswise by a sort of hinge beyond their middle. The folding is also clumsy, and the wing is gathered over the body with difficulty. The legs of the Colorado beetle are strong, terminated by a pair of hooks, by which it clings to plants.

The mouth is formed for biting and not for sucking, as in most of our previous subjects. If we examine closely we will observe an upper lip and a lower lip, and between them two pairs of jaws, which do not move up and down but laterally. One pair of jaws, the upper pair, is called the mandibles. They are strong and hard, used for biting off bits of leaves. It is this pair of jaws that is so remarkably developed in the *stag beetles*, known to some children as "pinching bugs." The second pair of jaws is called the *maxillæ*. They are used for chewing the food. To them, as well as to the lower lip, are attached little jointed arms, called *palpi*.

These insects have great power of endurance. They will walk for great distances in search of food, and, by direct experiment, they are known to have lived thirty days without food. In the spring, the beetles appear along with the first growth of potatoes, and while they devour some of the foliage of the potato plants, the damage is slight as compared with the destruction caused by the larvæ of the succeeding brood. These early beetles lay their eggs upon the leaves of the potato. We may find the orange colored eggs in masses, varying from a dozen to fifty, closely placed upon the under side of the potato leaf. It is said that a single female may lay as many as one thousand eggs in its lifetime. The eggs are sometimes found upon leaves of grass, smartweed, or other plants in the potato field. They hatch about a week later into peculiar looking hunchbacked grubs or larvæ of a reddish color, with markings of black spots in double rows on each side. The larvæ walk to the tenderest part of the plant and there feed very rapidly, increasing in size by successive moults until they are full grown. The length of time in the larval state is fifteen to twenty days, when they leave the plant and go into the ground a few inches below the surface and there pupate in a cell of earth. In about ten days

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later they emerge as perfect adults, which go in search of the plants again to lay eggs. There are from two to four annual broods in this country, varying with the latitude. In this latitude, two distinct broods are known to appear.

The insect passes the winter in the pupa stage, but if the autumn has been warm, the insect is likely to pass into the imago stage and burrow somewhat deeper into the ground, passing the winter in that condition.

SUGGESTIONS TO THE TEACHER

We must insist again upon having specimens alive or dead in the school room when giving the lesson in Nature Study. Remember always, that no account, however well rendered, will have much value unless the scholar can observe directly with his eyes the facts to be learned. Our papers are made purposely brief and descriptions very meager, to leave many points to be determined by a study of the objects.

The potato beetle is easily obtained in rural communities, and the teacher should store away a quantity of them in bottles for the winter's use.

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